

Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854 Attn: Aaron Fox

May 7, 2019

Dear Mr. Fox,

Enclosed please find the toxicological evaluation and chemical analyses report for the effluent sample received on April 8th, 2019. This is your second quarter 2019 bioassay. Please call me at (401) 353-3420 if you have any questions.

Sincerely,

Michael McCallum Technical Laboratory Director

NEW ENGLAND TESTING LABORATORY, INC.

59 Greenhill St., West Warwick, RI 02893 (401) 353-3420 TOXICOLOGICAL EVALUATION AND CHEMICAL ANALYSES OF EFFLUENT: NPDES Permit # MA0100633 Second Quarter 2019 Sample Lowell

> Prepared For: Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854

> > May 7, 2019

By
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, Rhode Island 02893

NETLAB CASE NUMBER: 9D08025



GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER

CONSTRUCTION MANAGEMENT

77 Batson Drive
Manchester, CT 06042
T: 860.643.9560
F: 860.646.7169



NEW ENGLAND BIOASSAY A DIVISION OF GZA CHRONIC AQUATIC TOXICITY TEST REPORT

Permitee:	L	owell RWWU			NPDES #	MAC	0100633							
Report submitted to:	New Englar	nd Testing Lab	oratori	es	-									
	59 Greenhill	Street, West V	Varwic	k RI	-									
Sample ID:		Effluent			-									
Test Month/Year:		April 2019			_									
NEB Proj#	0	5.0044476.00			_									
Test Type / Method:	Ceriodaphnia d	<i>lubia</i> Modified	d Chro	nic S	tatic-Rer	newal	Freshwater							
	Test Method 1002.0; EPA 821-R-02-013													
Effluent Sample Dates:	#14/7-8/	<u>/19</u> #2_	-10/1	9#3		l/11-12/19								
Test Start Date: 4/9/19														
Results Summary														
Your results were as fol	lows:													
Passed all permit limits														
	P	Acute Test Res	ults											
Species	LC50	A-NOE	С	Perr	nit Limit		Pass / Fail							
Ceriodaphnia dubia	>100%	100%		≥	100%		Pass							
	Cl	nronic Test Re	sults											
Species	C-NOEC	C-LOEC	IC	25	Permit I	imit	Pass/Fail							
Ceriodaphnia dubia	100%	>100%	>10	0%	N/A		N/A							
Data Qualifiers affecting	this test:													

Certifications & Approvals: NH ELAP (2071), NJ DEP (CT405)

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Test Report Certification

Permittee name:	Lowell RWWU	Permit number:	MA0100633
Client sample ID:	Effluent	Test Start Date:	4/9/19
Whol	e Effluent Toxicity Test	t Report Certification (Permi	ttee)
supervision in accord evaluate the information those persons directly knowledge and bel	dance with a system designed on submitted. Based on my ind responsible for gathering info lief, true, accurate, and compl	and all attachments were prepared un to assure that qualified personnel p quiry of the person or persons who n formation, the information submitted lete. I am aware that there are signification	roperly gather and nanage the system, or I is, to the best of my cant penalties for
Executed on:	(Date)	Authorized Signature	
		Print or Type Name and Title	
		Print or Type the Permittee's Na	ıme
		MA010063	3
		Print or Type the NPDES Permit	Number
Whole Effl	uent Toxicity Test Repo	ort Certification (Bioassay La	boratory)
The	e results reported relate only	to the samples submitted as receive	d
supervision in accord evaluate the information those persons directly knowledge and beli	dance with a system designed on submitted. Based on my ind responsible for gathering info ief, true, accurate, and compl	nd all attachments were prepared ur d to assure that qualified personnel p quiry of the person or persons who n ormation, the information submitted lete. I am aware that there are signifi bility of fine and imprisonment for kr	roperly gather and nanage the system, or lis, to the best of my cant penalties for
Executed on:	5 (L) 19 (Date)	Komberly Wi Laboratory Man New England Bioassay a	_

General Test Conditions

Permittee name:	Lowell RWWU		Permit number:	MA0100633
Client sample ID:	Effluent		Test Start Date:	4/9/19
	Sample Collect	ion Information		
Effluent #1 Dates/Times: Effluent #2 Dates/Times:	4/7-8/19 @ 0700-0700 4/9-10/19 @ 0700-0700	Receiving Water i	#2 Date/Time:	4/8/19 @ 0830 4/10/19 @ 0820
Effluent #3 Dates/Times:	4/11-12/19 @ 0700-0700	Receiving Water		4/12/19 @ 0830
Were a minimum of three s Were samples used within t * sample collection note:	amples collected? Yes 🗠	110 - 1300 111	ote below) No □ * (see not	re below)
	Test Co	nditions		
Control water: Receiving Effluent concentrations test Was effluent salinity adjuster	tory synthetic soft water (hardness, water collected at a point immediae): ed: 0%, 6.25%, 12.5%, 25%, 5 ed? No Yes water water (hardness) Chlorine is measured using 4500	liately upstream of 0%, 100% ith Instant Ocean se	or away from the	discharge ppt
TRC results and further info	rmation about aeration of sample	s can be found atta	ched in "sample re	eceipt chemistry"
	Reference T	oxicant Data		
	Ceriodapl	hnia dubia		
	Date:	4/1/19	_	
	Toxicant:	Sodium chloride		
	Dilution Water:	NEB CTRMH		
	Organism Source:	NEB	_	
	Reproduction IC25: Results within range	0.81 g/	1	

Ceriodaphnia dubia Test Results

Permittee name:	L	owell RWWU	Perm	nit number:	MA0100633						
Client sample ID:	Efflo	uent Tes	t Dates:	4/9/19	4/15/19						
		Test Acceptability Criteria	1		=====						
Lab Diluent Survival:	Diluent Survival:										
River Control Survival:	100 %	Mean River Control Reproduction	on:	37.3 young per female							
Thiosulfate Control Survival:	N/A%	Mean Thiosulfate Control Repro	oduction:	N/Ayou	ung per female						
Presence of an asterisk (*) indica of the following page.	ates EPA crite	ia was not met, see explanation	in the "Resul	ts Discussion"	section at the bottom						
		Test Results									

		Permit Limit	Test Result	Pass/Fail Status
Acuto	48 hr LC50	≥ 100%	>100%	Pass
Acute Data	48 hr NOEC		100%	
Julu	TUa			
	Chronic LC50		>100%	
	Survival C-NOEC		100%	
	Survival C-LOEC		>100%	
	Reproduction C-NOEC		100%	
Chuania	Reproduction C-LOEC		>100%	
Chronic Data	Reproduction IC25		>100%	
Duta	Reproduction IC50		>100%	
	Reportable C-NOEC		100%	
	Reportable C-LOEC		>100%	
	MATC		>100%	
	TUc			

Presence of an asterisk (*) indicates qualified data, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Variability
Reproduction PMSD:16.1% Upper & Lower EPA bounds: 13 - 47%
\square PMSD exceeds upper bounds. Test results are highly variable and may not be sensitive enough to determine
the presence of toxicity at the permit limit concentration (PLC)
$^{oxedsymbol{oxed}}$ The PMSD falls within the upper (47%) and lower (13%) bounds. Results are reportable.
\square PMSD falls below the lower bound test variability criterion. The test is very sensitive. The relative percent
difference (RPD) between the control and each treatment was calculated and compared to the lower bound.
The RPD values for all concentrations fall below the lower bound. Any differences observed in this test are considered statistically insignificant.
Some of the concentrations that were flagged as statistically significant have RPD values that fall below the lower bound. Any differences observed in these concentrations will not be considered statistically significantly decreased from the control.
☐ No statistically significant reductions were observed in this test.

Ceriodaphnia dubia Test Results

Permittee name:	Lowell RWWU	Per	mit number:	MA0100633									
Client sample ID:	Effluent	Test Dates:	4/9/19	4/15/19									
Concentration - Response Evaluation													
Survival: #12 No significant effects at any test concentration with a flat concentration-response curve. Test concentrations performed very similarly to dilution control.													
Reproduction: #12 No significant effects at any test concentration with a relatively flat concentration-response curve. Test concentrations performed both above and below (but similarly to) the dilution control.													
The concentration - response	relationship was reviewed and the fol	lowing determination	was made:										
Survival Reproduction	1												
XX	Results are reliable and reportab	le											
	Results are anomalous (see	explanation below)											
	Results are inconclusive - retest (see explanation below	')										
	Results Discussion (i	if applicable):											

TEST METHODS

Ceriodaphnia dubia

Test type: Modified Chronic Static Renewal Freshwater Test

Test Reference Manual: EPA-821-R-02-013 "Short-Term Methods for Estimating the Chronic Toxicity of

Effluents and Receiving Water to Freshwater Organisms"

Test Method: Ceriodaphnia dubia Survival and Reproduction Test - EPA 1002.0

Temperature: $25 \text{ °C} \pm 1 \text{ °C}$ (Temperatures should not deviate by more than 3 °C during the test)

(required)

Light Quality: Ambient Laboratory Illumination (recommended)

Light Intensity: 10-20 μE/m2/s, or 50-100 ft-c (recommended)

Photoperiod: 16 hours light, 8 hours dark (recommended)

Test chamber size: 30 mL (recommended minimum)

Test solution volume: 15 mL (recommended minimum)

Renewal of Test Solutions: Daily (required)

Age of Test Organisms: Less than 24 hours; and all released within a 8-h period (required)

Number of Neonates

Per Test Chamber: 1 Assigned using blocking by known parentage (required)

Number of Replicate Test

Chambers Per Treatment: 10 (required minimum)

Number of Neonates Per

Test Concentration: 10 (required minimum)

Feeding Regime: Fed 0.1 mL each of YCT and algal suspension per exposure chamber daily.

(recommended)

Cleaning: Use new plastic cups daily (recommended)

Aeration: None (recommended)

Test Duration: Until 60% or more of control females have three broods

(maximum test duration 8 days) (required)

Endpoints: Survival and reproduction (required)

Test Acceptability: 80% or greater survival of all control organisms and an average of 15 or more

young per surviving female in the control solutions. 60% of surviving control

females must produce three broods. (required)

Sampling Requirements: Minimum of three samples with a maximum holding time of 36 hours before

first use. (required)

Sample volume required: 1 L/Day (recommended)

CERIODAPHNIA DUBIA DATASHEETS & STATISTICAL ANALYSIS

NEW ENGLAND BIOASSAY TOXICITY DATA FORM

	CHK	DNIC COVER SHE	:E1	
CLIENT: N	ew England Testing Labora	atories	C.dubia TEST II	D# 19-449
ADDRESS:	59 Greenhill Street	•	CHAIN OF CUSTOD	9
	West Warwick, RI 0289	3	NEB PROJEC	
PERMITTEE:	Lowell RWWU		SAMPLE	
PERMIT NUMBER:	MA0100633			
DILUTION WATER:	Laboratory Soft Water	r		
		INVERTEBRATES		
TEST SET	-UP TECHNICIAN:	PD		
	-	riodaphnia dubia		
		Cd19(RMH 066)		
	AGE:	< 24 hours		
TEST SOLUTIO	N VOLUME (mls):	15		
	R TEST CHAMBER:	1		
ORGANISMS PER C	CONCENTRATION:	10		
	LABORATO	DRY CONTROL WATER	R (SRCF)	
		Hardness mg/L	Alkalinity mg/L	
	Lot Number	CaCO ₃	CaCO ₃	
	C39-S008	50	35	
	· -			
		DATE	TIME	
	TEST START:	4/9/19	1141	
	TEST END:	4/15/19	0950	
	·		·	
COMMENTS:				
0				
0				
0				
A				
		2-16		7/10/19
REVIEWED BY:			DATE:	O

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADI	DRESS: Lowe	I Regiona	ıl WV	N Utility, 1st Street Boulevard, Lowell MA 01850							
NEB PROJECT NUMBER: 05.0044476.00					NEB TEST NUMBER: 19-449				C39-1787/88		
TEST ORGANISM:	ST ORGANISM: Ceriodaphnia dubia				<24 hours	Lot #	Cd19(RMH 066)				
START DATE:	4/9/19	TIME:	11	41	END DATE:	4/	15/19	TIME:	0950		

			Cultur	e Lot#			Cd19(F	MH 06	66)						
	Cup#	B2	В3	B4	B5	В6	В8	B11	B12	B13	A12	Total Live	# Live	Analyst-	Analyst-
Effluent	Day					Rep	licate					Young	Adults	Transfer	Counts
Concentration	Number	Α	В	С	D	Е	F	G	Н	1	ı				
	0	✓	✓	✓	✓	✓	√	✓	✓	✓	✓	0	10	PD	
	1	√	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	ко	
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	ММ	11
NEB Lab	3	5	✓_	7	6	6	✓	7	5	5	5	46	10	CW	cw
Synthetic	4	12	3	13	9	14	6	11	11	15	15	109	10	PD	PD
Diluent	5	√	✓	✓	3	✓	11	✓	✓	✓	✓	14	10	CW	CW
	6	20	19	23	16	23	17	20	20	23	19	200	10	СН	СН
	7														
	totals	37	22	43	34	43	34	38	36	43	39	369	10		МС
		Α	В	С	D	Е	F	G	Н	1	J				
	0	√	✓	✓	✓	√	√	✓	✓	✓	√	0	10		
	1	√	✓	✓	✓	√	√	✓	✓	√	√	0	10		
	2	√	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		116
Merrimack	3	6	6	6	6	7	✓	6	6	✓	4	47	10		
River	4	12	14	14	15	12	6	15	14	7	14	123	10		
Control	5	√	✓	✓	✓	√	14	✓	✓	5	√	19	10	NI 10	
	6	19	18	24	24	24	19	17	11	8	20	184	10		
	7														5
	totals	37	38	44	45	43	39	38	31	20	38	373	10		
		Α	В	С	D	E	F	G	Н	1	J				
	0	√	✓	✓	✓	√	✓	✓	✓	✓	✓	0	10	- 2	
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	5	5	4	6	6	5	6	5	5	5	52	10		
6.25%	4	10	12	11	10	14	11	11	11	12	10	112	10		
	5	✓	✓	✓	✓	√	✓	√	√	√	√	0	10		
	6	18	22	19	21	19	20	20	20	21	20	200	10		
	7														
	totals	33	39	34	37	39	36	37	36	38	35	364	10		

otes:				
,				

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS: Lowell Regional WW Utility, 1st Street Boulevard, Lowell MA 01850

NEB PROJECT NUMBER: 05.0044476.00 ORGANISM: Ceriodaphnia dubia START DATE: 4/9/19

												Total			
			Replicate										# Live		
Effluent Concentration	Day Number	A	В	С	D	E	F	G	н		J	Live Young	Adults		1 1
Concentration	0	\(\frac{\cappa}{}\)	1	1	1	1	1	1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u> </u>	<i>\</i>	0	10		
	1	1	1	1	<u>,</u>	1	1	1	<u>,</u>	T V	,	0	10		1
	2	1	1	1	1	1	1	1	<i>\</i>	1	1	0	10		
	3	5	5	6	6	6	1	6	5	6	5	50	10		
	4	13	11	15	16	12	6	12	14	13	13	125	10		
12.5%	5	1	1	1	1	1	13	1	√	1	1	13	10		
	6	20	21	23	23	24	19	23	22	25	21	221	10		
	7														
	totals	38	37	44	45	42	38	41	41	44	39	409	10		
		Α	В	С	D	Е	F	G	Н	1	J				
	0	√	√	1	√	V	1	V	V	1	√	0	10		1
	1	√	√	√	√	V	√	V	√	1	_	0	10		
	2	√	√	√	√	√	√	1	√	V	√	0	10		
	3	6	5	3	5	5	√	6	1	6	5	42	10		
25%	4	√	12	8	√	15	5	12	6	V	9	67	10		
	5	12	√	√	12	√	12	√	14	14	√	64	10		
	6	21	22	23	18	23	13	22	19	19	22	202	10		
	7														
	totals	39	39	34	35	43	30	40	40	39	36	375	10		
		Α	В	С	D	E	F	G	Н		J				
	0	✓	✓	✓	>	✓	✓	✓	✓	✓	√	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	4	5	6	6	7	✓	6	✓	6	7	47	10		
50%	4	√	13	11	14	√	6	15	5	✓	✓	64	10		
	5	8/x	✓	✓	√	14	11	✓	10	13	11	67	9		
	6	Х	25	18	22	21	18	21	✓	17	17	159	9		
	7														
	totals	12	43	35	42	42	35	42	15	36	35	337	9		
		Α	В	С	D	E	F	G	Н	I	J				
	0	✓	_<	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	4	5	6	6	6	√	7	5	5	6	50	10	J. T	
100%	4	11	13	12	✓	11	5	√	✓	13	12	77	10		J.
	5	✓	√	✓	14	✓	10	10	12	✓	✓	46	10		
	6	18	19	14	21	18	16	12	18	16	17	169	10		
	7														
i	totals	33	37	32	41	35	31	29	35	34	35	342	10		

Report Date:

16 Apr-19 10:13 (p 1 of 6)

	S Ana		71 L						Teport Date.	-10		
									Test Code/ID	:	19-449 / 1	0-5501-195
Cerioda	aphnia	7-d Survival and	d Reproduc	ction Te	est						New Englan	d Bioassay
Analysi	is ID:	06-8232-5132	End	point:	2d Survival Rat	e		(CETIS Versio	n: CETISv	1.9.4	
Analyze	ed:	16 Apr-19 10:12	Ana	lysis:	Linear Interpola	ation (ICPIN	۷)		Status Level:	1		
Batch II	D:	05-0819-4234	Test	Туре:	Reproduction-S	Survival (7d)		Analyst:			
Start Da	ate:	09 Apr-19 11:41	Prot	ocol:	EPA/821/R-02-	013 (2002)		1	Diluent: L	aboratory Wa	iter	
_		15 Apr-19 09:50	Spe	cies:	Ceriodaphnia d	ubia		I	Brine: N	lot Applicable		
Test Le	ngth:	5d 22h	Taxo	on:	Branchiopoda				Source: In	n-House Cultu	ıre	Age: <2
Sample	D:	01-4650-3640	Cod	e:	8BB77D8			1	Project:			
Sample	Date:	08 Apr-19 07:00	Mate	erial:	WWTF Effluent	t			-	owell RWWU	(MA010063	3)
Receipt	t Date:	08 Apr-19 15:35	CAS	(PC):				,	Station:			
Sample	Age:	29h	Clie	nt:	New England T	esting Lab	s					
Linear I	Interpo	olation Options										
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	6 CL Meth	od				
Log(X)		Linear	1043		200	Yes			terpolation			
Point E	stimat	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	•					
LC50	>100	n/a	n/a	<1	n/a	n/a						
2d Surv	vival R	ate Summary				Calc	ulated Varia	te(A/B)			Isotor	ic Variate
Conc-%												
	6	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effec	t A/B	Mean	%Effect
	ó	Code	Count 10	Mean 1.0000		Max 1.0000	Std Dev 0.0000	CV%		t A/B 10/10	Mean 1	%Effect
0	6				1.0000				0.0%			
0 6.25	6		10	1.0000	1.0000 1.0000	1.0000	0.0000	0.00%	0.0% 0.0%	10/10	1	0.0%
0 6.25 12.5	6		10 10	1.0000	1.0000 1.0000 1.0000	1.0000 1.0000	0.0000 0.0000	0.00%	0.0% 0.0% 0.0%	10/10 10/10	1	0.0% 0.0%
0 6.25 12.5 25	6		10 10 10	1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000	0.0000 0.0000 0.0000	0.00% 0.00% 0.00%	0.0% 0.0% 0.0% 0.0%	10/10 10/10 10/10	1 1 1	0.0% 0.0%
0 6.25 12.5 25 50	6		10 10 10 10	1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00%	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0%	10/10 10/10 10/10 10/10	1 1 1	0.0% 0.0% 0.0% 0.0%
0 6.25 12.5 25 50 100			10 10 10 10 10	1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0%	10/10 10/10 10/10 10/10 10/10	1 1 1 1	0.0% 0.0% 0.0% 0.0% 0.0%
0 6.25 12.5 25 50 100 2d Surv	vival Ra	D	10 10 10 10 10	1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0%	10/10 10/10 10/10 10/10 10/10	1 1 1 1	0.0% 0.0% 0.0% 0.0%
0 6.25 12.5 25 50 100 2d Surv	vival Ra	D ate Detail	10 10 10 10 10 10	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 3	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%	10/10 10/10 10/10 10/10 10/10 10/10	1 1 1 1 1 1 1	0.0% 0.0% 0.0% 0.0% 0.0% 0.0%
0 6.25 12.5 25 50 100 2d Surv Conc-%	vival Ra	D ate Detail Code	10 10 10 10 10 10 10	1.0000 1.0000 1.0000 1.0000 1.0000	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 Rep 3	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%	10/10 10/10 10/10 10/10 10/10 10/10	1 1 1 1 1 1	0.0% 0.0% 0.0% 0.0% 0.0% 0.0%
0 6.25 12.5 25 50 100 2d Surv Conc-% 0	vival Ra	D ate Detail Code	10 10 10 10 10 10 10 Rep 1	1.0000 1.0000 1.0000 1.0000 1.0000 Rep 2	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 Rep 3 0 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 4	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 5	0.00% 0.00% 0.00% 0.00% 0.00% Rep 6	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 Rep 7 0 1.0000	10/10 10/10 10/10 10/10 10/10 10/10 Rep 8	1 1 1 1 1 1 1 1 1 1 1	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Rep 10 1.0000
0 6.25 12.5 25 50 100 2d Surv Conc-% 0 6.25	vival Ra	D ate Detail Code	10 10 10 10 10 10 10 10 Rep 1 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 Rep 3 0 1.0000 0 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 4 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 5 1.0000 1.0000	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% Rep 6 1.000 1.000	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 7 1.0000 1 1.0000	10/10 10/10 10/10 10/10 10/10 10/10 Rep 8 1.0000 1.0000	1 1 1 1 1 1 1 1 1 1 1.0000 1.0000 1.0000	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.000 1.0000 1.0000
0 6.25 12.5 25 50 100 2d Surv Conc-% 0 6.25 12.5	vival Ra	D ate Detail Code	10 10 10 10 10 10 10 10 Rep 1 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 Rep 3 0 1.0000 0 1.0000 0 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 5 1.0000 1.0000 1.0000	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 1.000 1.000 1.000	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 7 1.0000 1 1.0000 0 1.0000	10/10 10/10 10/10 10/10 10/10 10/10 10/10 Rep 8 1.0000 1.0000 1.0000	1 1 1 1 1 1 1 1 1 1 1 1.0000 1.0000 1.0000	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.000 1.0000 1.0000 1.0000
0 6.25 12.5 25 50	vival Ra	D ate Detail Code	10 10 10 10 10 10 10 10 Rep 1 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 4 1.0000 1.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 5 1.0000 1.0000	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% Rep 6 1.000 1.000	6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 6 0.0% 7 1.0000 1 1.0000 0 1.0000 0 1.0000	10/10 10/10 10/10 10/10 10/10 10/10 Rep 8 1.0000 1.0000	1 1 1 1 1 1 1 1 1 1 1.0000 1.0000 1.0000	0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Rep 10 1.0000 1.0000

20 Survivai	Rate Bind	miais
Cono 9/	•	odo

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

000-222-335-4

CETIS™ v1.9.4.1

Analyst:____ QA:__

Report Date: Test Code/ID: 16 Apr-19 10:13 (p 2 of 6) 19-449 / 10-5501-1956

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: Analyzed:

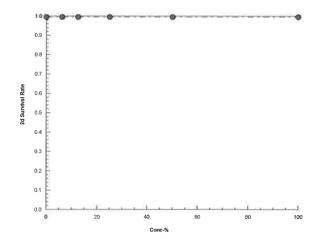
06-8232-5132 16 Apr-19 10:12 Endpoint: 2d Survival Rate
Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.9.4

Status Level: 1

Graphics



Panert Date:

16 Apr-19 10:13 (p 3 of 6)

Age: <24

Ceriodaphnia 7-d Survival and Reproduction Test		New England Bioassay
	Test Code/ID:	19-449 / 10-5501-1956
CE 115 Analytical Report	Report Date.	10 Apr-19 10.13 (p 3 01 0)

Analysis ID:	09-1164-7613	Endpoint:	6d Survival Rate	CETIS Version:	CETISv1.9.4
Amalumadı	16 Apr 10 10:12	Amalumias	Linear Internalation (ICDIN)	Otation I accele	4

Analyzed: 16 Apr-19 10:13 Analysis: Linear Interpolation (ICPIN) Status Level: 1

Batch ID: 05-0819-4234 Test Type: Reproduction-Survival (7d) Analyst: Start Date: 09 Apr-19 11:41 EPA/821/R-02-013 (2002) Protocol: Diluent: Laboratory Water Not Applicable Ending Date: 15 Apr-19 09:50 Species: Ceriodaphnia dubia Brine: Test Length: 5d 22h Taxon: Branchiopoda Source: In-House Culture

Sample ID: 01-4650-3640 Code: 8BB77D8 Project:

Sample Date: 08 Apr-19 07:00 Material: **WWTF Effluent** Lowell RWWU (MA0100633) Source:

Receipt Date: 08 Apr-19 15:35 CAS (PC): Station: Sample Age: 29h Client: New England Testing Labs

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	271799	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

6d Survival R	ate Summary		Calculated Variate(A/B)								Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect	
0	D	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%	
6.25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%	
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%	
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%	
50		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.95	5.0%	
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.95	5.0%	

6d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1,0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

000-222-335-4

CETIS™ v1.9.4.1

Analyst:_ QA:

Report Date:

16 Apr-19 10:13 (p 4 of 6)

Test Code/ID:

19-449 / 10-5501-1956

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: Analyzed:

09-1164-7613 16 Apr-19 10:13

6d Survival Rate Endpoint:

Linear Interpolation (ICPIN)

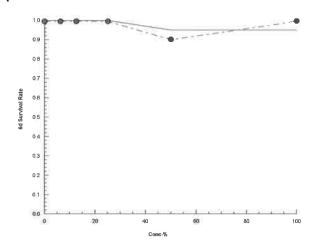
Analysis:

CETIS Version: CETISv1.9.4

Status Level:

1

Graphics



Report Date: Test Code/ID: 16 Apr-19 10:13 (p 5 of 6) 19-449 / 10-5501-1956

Ceriodaphni	ia 7-d Survival a	nd Reprodu	ction Te	st					N	lew Englan	d Bioassay
Analysis ID:	: 00-1563-7312	End	point:	Reproduction			CET	IS Version:	CETISv	1.9.4	
Analyzed:	16 Apr-19 10:1	3 Ana	lysis:	Linear Interpola	ation (ICPIN	۷)	Stat	us Level:	1		
Batch ID:	05-0819-4234	Test	t Type:	Reproduction-S	Survival (7d)	Ana	lyst:			
Start Date:	09 Apr-19 11:4	1 Prof	tocol:	EPA/821/R-02-	013 (2002)		Dilu	ent: Labo	oratory Wa	ter	
Ending Date	e: 15 Apr-19 09:5	i0 Spe	cies:	Ceriodaphnia d	ubia		Brin	e: Not	Applicable		
Test Length	: 5d 22h	Tax	on:	Branchiopoda			Sou	rce: In-H	ouse Cultu	ıre	Age: <24
Sample ID:	01-4650-3640	Cod	le:	8BB77D8			Proj	ect:			
Sample Date	e: 08 Apr-19 07:0	0 Mat	erial:	WWTF Effluen	t		Sou	rce: Low	ell RWWU	(MA010063	33)
Receipt Date	e: 08 Apr-19 15:3	5 CAS	(PC):				Stat	ion:			
Sample Age	: 29h	Clie	nt:	New England T	esting Lab	s					
_inear Interp	polation Options	i									
X Transform	n Y Transfor	m See	d	Resamples	Exp 95%	6 CL Meth	od				
Linear	Linear	5936	687	200	Yes	Two-	Point Interp	olation			
Test Accent	ability Criteria	TAC L	imits								
ear wecehi											
•	Test Sta	t Lower		Overlap	Decision	1					
Attribute Control Resp Point Estima	36.9 ates	t Lower 15	Upper >>	Yes	Passes C	Criteria					
Attribute Control Respondent Estima Level % C25 >10	36.9 ates 95% LCI	t Lower 15	Upper			Criteria					
Attribute Control Resp Point Estima Level % C25 >10 C50 >10	36.9 ates 95% LCI	15 - 95% UCL n/a	Vpper >> TU <1	Yes 95% LCL	95% UCL n/a n/a	Criteria	riate			Isoto	nic Variate
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction	36.9 ates 95% LCI 00 n/a 00 n/a	15 - 95% UCL n/a	Vpper >> TU <1	Yes 95% LCL	95% UCL n/a n/a	Criteria	riate CV%	%Effect		Isoto Mean	nic Variate %Effect
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproductio	36.9 ates 95% LCI 00 n/a 00 n/a on Summary	15 95% UCL n/a n/a	Vpper >> TU <1 <1	Yes 95% LCL n/a n/a	95% UCL n/a n/a	Criteria - alculated Va		%Effect 0.0%			
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-%	36.9 ates 95% LCI 00 n/a 00 n/a on Summary Code	t Lower 15 95% UCL n/a n/a Count	Vpper >> TU <1 <1 Mean	Yes 95% LCL n/a n/a	95% UCL n/a n/a	criteria - alculated Va Std Dev	CV%			Mean	%Effect
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% 0 6.25	36.9 ates 95% LCI 00 n/a 00 n/a on Summary Code	t Lower 15 95% UCL n/a n/a Count 10	Vpper >> TU <1 <1 <1 Mean 36.9	95% LCL n/a n/a	95% UCL n/a n/a Ca Max	elculated Va Std Dev 6.297	CV% 17.07%	0.0%		Mean 38.07	%Effect
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% 0 5.25	36.9 ates 95% LCI 00 n/a 00 n/a on Summary Code	t Lower 15 95% UCL n/a n/a 10 10	Vpper >> TU <1 <1 Mean 36.9 36.4	95% LCL n/a n/a Min 22 33	95% UCL n/a n/a Ca Max 43 39	alculated Va Std Dev 6.297 2.011	CV% 17.07% 5.53%	0.0% 1.36%		Mean 38.07 38.07	%Effect 0.0% 0.0%
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% 0 6.25 12.5	36.9 ates 95% LCI 00 n/a 00 n/a on Summary Code	15 95% UCL n/a n/a 10 10 10	TU <1 <1 Mean 36.9 36.4 40.9	95% LCL n/a n/a Min 22 33 37	95% UCL n/a n/a Ca Max 43 39 45	alculated Va Std Dev 6.297 2.011 2.846	CV% 17.07% 5.53% 6.96%	0.0% 1.36% -10.84% -1.63% 8.67%		Mean 38.07 38.07 38.07	%Effect 0.0% 0.0% 0.0%
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% 0 6.25 12.5	36.9 ates 95% LCI 00 n/a 00 n/a on Summary Code	15 95% UCL n/a n/a 10 10 10 10	TU <1 <1 Mean 36.9 36.4 40.9 37.5	95% LCL n/a n/a Min 22 33 37 30	95% UCL n/a n/a Ca Max 43 39 45 43	alculated Va Std Dev 6.297 2.011 2.846 3.749	CV% 17.07% 5.53% 6.96% 10.00%	0.0% 1.36% -10.84% -1.63%		Mean 38.07 38.07 38.07 37.5	%Effect 0.0% 0.0% 0.0% 1,49%
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% 0 3.25 12.5 25 60	36.9 ates 95% LCI 00 n/a 00 n/a con Summary Code D	t Lower 15 95% UCL n/a n/a Count 10 10 10 10 10	Vpper >> TU <1 <1 Mean 36.9 36.4 40.9 37.5 33.7	95% LCL n/a n/a Min 22 33 37 30 12	95% UCL n/a n/a Ca Max 43 39 45 43 43	alculated Va Std Dev 6.297 2.011 2.846 3.749 11.18	CV% 17.07% 5.53% 6.96% 10.00% 33.16%	0.0% 1.36% -10.84% -1.63% 8.67%		Mean 38.07 38.07 38.07 37.5 33.95	%Effect 0.0% 0.0% 0.0% 1.49% 10.81%
Conc-% Conc-%	36.9 ates 95% LCI 00 n/a 00 n/a con Summary Code D	t Lower 15 95% UCL n/a n/a Count 10 10 10 10 10	Vpper >> TU <1 <1 Mean 36.9 36.4 40.9 37.5 33.7	95% LCL n/a n/a Min 22 33 37 30 12	95% UCL n/a n/a Ca Max 43 39 45 43 43	alculated Va Std Dev 6.297 2.011 2.846 3.749 11.18	CV% 17.07% 5.53% 6.96% 10.00% 33.16%	0.0% 1.36% -10.84% -1.63% 8.67%	Rep 8	Mean 38.07 38.07 38.07 37.5 33.95	%Effect 0.0% 0.0% 0.0% 1.49% 10.81%
Control Respondence Control Respondence Control Respondence Concord Concord	95% LCI 00 n/a 00 n/a 00 n/a 00 Summary Code D	t Lower 15 95% UCL n/a n/a Count 10 10 10 10 10 10	Vpper >> TU <1 <1 Mean 36.9 36.4 40.9 37.5 33.7 34.2	Yes 95% LCL n/a n/a Min 22 33 37 30 12 29	95% UCL n/a n/a Ca Max 43 39 45 43 43 41	alculated Va Std Dev 6.297 2.011 2.846 3.749 11.18 3.327	CV% 17.07% 5.53% 6.96% 10.00% 33.16% 9.73%	0.0% 1.36% -10.84% -1.63% 8.67% 7.32%	Rep 8 36	Mean 38.07 38.07 38.07 37.5 33.95 33.95	%Effect 0.0% 0.0% 0.0% 1.49% 10.81%
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction 6.25 12.5 25 60 100 Reproduction Conc-%	95% LCI 00 n/a 00 n/a 00 n/a 00 summary Code D	t Lower 15 95% UCL n/a n/a Count 10 10 10 10 10 Rep 1	Vpper >> TU <1 <1 Mean 36.9 36.4 40.9 37.5 33.7 34.2 Rep 2	Yes 95% LCL n/a n/a Min 22 33 37 30 12 29 Rep 3	95% UCL n/a n/a Ca Max 43 39 45 43 41	alculated Va Std Dev 6.297 2.011 2.846 3.749 11.18 3.327	CV% 17.07% 5.53% 6.96% 10.00% 33.16% 9.73%	0.0% 1.36% -10.84% -1.63% 8.67% 7.32%		Mean 38.07 38.07 38.07 37.5 33.95 33.95	%Effect 0.0% 0.0% 0.0% 1.49% 10.81% Rep 10
Attribute Control Resp Point Estima Level % C25 >10 C50 >10 Reproduction Conc-% C55 C50 C50 C60 Reproduction Conc-% C55 C50 C50 C60 C60 C60 C60 C60 C60 C60 C60 C60 C6	95% LCI 00 n/a 00 n/a 00 n/a 00 summary Code D	t Lower 15 95% UCL n/a n/a Count 10 10 10 10 10 70 70 8ep 1 37	Vpper >> TU <1 <1 Mean 36.9 36.4 40.9 37.5 33.7 34.2 Rep 2	Yes 95% LCL n/a n/a Min 22 33 37 30 12 29 Rep 3 43	95% UCL n/a n/a Ca Max 43 39 45 43 41 Rep 4	Criteria Criter	CV% 17.07% 5.53% 6.96% 10.00% 33.16% 9.73% Rep 6	0.0% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 7	36	Mean 38.07 38.07 38.07 37.5 33.95 33.95 Rep 9	%Effect 0.0% 0.0% 0.0% 1.49% 10.81% Rep 10
Attribute Control Resp Point Estima Level % IC25 >10 IC50 >10	95% LCI 00 n/a 00 n/a 00 n/a 00 summary Code D	t Lower 15 95% UCL n/a n/a 10 10 10 10 10 10 37 33	TU <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Yes 95% LCL n/a n/a Min 22 33 37 30 12 29 Rep 3 43 34	95% UCL n/a n/a Ca Max 43 39 45 43 43 41 Rep 4	Criteria Criter	CV% 17.07% 5.53% 6.96% 10.00% 33.16% 9.73% Rep 6 34 36	0.0% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 7	36 36	Mean 38.07 38.07 38.07 37.5 33.95 33.95 Rep 9 43 38	%Effect 0.0% 0.0% 0.0% 1.49% 10.81% 10.81% Rep 10 39

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Report Date: Test Code/ID: 16 Apr-19 10:13 (p 6 of 6) 19-449 / 10-5501-1956

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

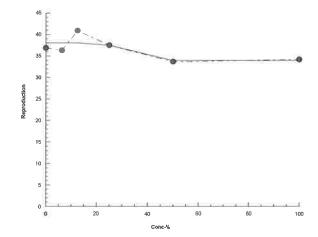
Analysis ID: Analyzed:

00-1563-7312 16 Apr-19 10:13 Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Status Level: CETISv1,9.4 1

Graphics



Report Date: Test Code/ID: 16 Apr-19 10:13 (p 1 of 2) 19-449 / 10-5501-1956

									Τe	est Code/	ID:		19-449 / 1	0-5501-195
Ceriodaphnia	a 7-d	Survival and	l Repr	roduction T	est							N	lew Englan	d Bioassa
Analysis ID:	09-4	341-8163		Endpoint:	6d S	Survival Rat	e		CI	ETIS Vers	ion:	CETISv	1.9.4	
Analyzed:	16 A	pr-19 10:13		Analysis:	STF	2xK Contir	ngency Table	es	St	atus Leve	el:	1		
Batch ID:	05-0	819-4234		Test Type:	Rep	roduction-S	urvival (7d)		Aı	nalyst:				
Start Date:	09 A	pr-19 11:41		Protocol:	EP/	4/821/R-02-	013 (2002)		Di	luent:	Labo	ratory Wa	ter	
Ending Date:	: 15 A	pr-19 09:50		Species:	Cer	iodaphnia d	ubia		Ві	rine:	Not A	Applicable		
Test Length:	5d :	22h		Taxon:	Bra	nchiopoda			S	ource:	In-H	ouse Cultu	re	Age: <2
Sample ID:	01-4	650-3640		Code:	8BE	377D8			Pi	oject:				
Sample Date:	: 08 <i>F</i>	pr-19 07:00		Material:	WW	/TF Effluent			S	ource:	Lowe	ell RWWU	(MA010063	33)
Receipt Date:	: 08 A	pr-19 15:35		CAS (PC):					St	ation:				
Sample Age:	29h			Client:	Nev	v England T	esting Labs							
Data Transfo	rm		Alt F	łур					NOEL	LOEI	L	TOEL	TU	
Untransformed	d		C > T						100	>100		n/a	1	
Fisher Exact/	/Bonf	erroni-Holm	Test											
Control	VS	Group		Test	Stat	P-Type	P-Value	Decision	(a:5%)					
Dilution Water	г	6.25		1.000	0	Exact	1.0000	Non-Signi						
		12.5		1.000	0	Exact	1.0000	Non-Signi						
		25		1.000	0	Exact	1.0000	Non-Signi	ificant Eff	ect				
		50		0.500	0	Exact	1.0000	Non-Signi	ificant Eff	ect				
		100		1.000	0	Exact	1.0000	Non-Signi	ificant Eff	ect				
Data Summai	ry													
Conc-%		Code	NR	R		NR + R	Prop NR	Prop R	%Effec	t				
0		D	10	0		10	1	0	0.0%					
6.25			10	0		10	1	0	0.0%					
12.5			10	0		10	1	0	0.0%					
25			10	0		10	1	0	0.0%					
50			9	1		10	0.9	0,1	10.0%					
100			10	0		10	1	0	0.0%					
6d Survival R	Rate D	etail												
Conc-%		Code	Rep '			Rep 3	Rep 4	Rep 5	Rep 6	Rep		Rep 8	Rep 9	Rep 10
		D	1.000	00 1.000	0	1.0000	1.0000	1.0000	1.0000	1.000	00	1.0000	1.0000	1.0000
0														
-			1.000	00 1.000	0	1.0000	1.0000	1.0000	1.0000	1.000	00	1.0000	1.0000	1.0000
0 6.25 12.5			1.000			1.0000 1.0000	1.0000 1.0000	1.0000 1.0000	1.0000 1.0000	1.000		1.0000 1.0000	1.0000 1.0000	1.0000 1.0000

6d Survival R	Rate Binomials										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

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CETIS™ v1.9.4.1

Analyst:_____ QA:____

Report Date:

16 Apr-19 10:13 (p 2 of 2)

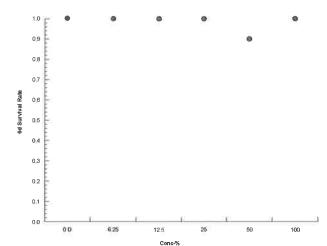
Test Code/ID:

19-449 / 10-5501-1956

Ceriodaphnia 7-d Survival and Reproduction Test	New England Bioassay

Analysis ID:09-4341-8163Endpoint:6d Survival RateCETIS Version:CETIS V1,9.4Analyzed:16 Apr-19 10:13Analysis:STP 2xK Contingency TablesStatus Level:1

Graphics



Report Date: Test Code/ID: 16 Apr-19 10:13 (p 1 of 2) 19-449 / 10-5501-1956

· · · · · · · · · · · · · · · · · · ·	a 7-a Si	irvival and	а кергоац	iction Test						N	ew Englan	d Bioassa
Analysis ID:	06-18	25-2143	En	•	eproduction			CET	S Versio	n: CETISv1	1.9.4	
Analyzed:	16 Ap	r-19 10:13	An	alysis: No	onparametric	-Control vs	Treatments	Statı	ıs Level:	11		
Batch ID:	05-08	19-4234	Tes	st Type: Re	eproduction-S	Survival (7d)		Anal	yst:			
Start Date:	09 Ap	r-19 11:41	Pro	otocol: EF	PA/821/R-02-	-013 (2002)		Dilue	ent: La	aboratory Wat	ter	
Ending Date:	15 Ap	r-19 09:50	Spe	ecies: Ce	eriodaphnia d	lubia		Brine	e: N	ot Applicable		
Test Length:	5d 22	!h	Tax	con: Br	anchiopoda			Sour	rce: In	-House Cultu	re	Age: <2
Sample ID:	01-46	50-3640	Co	de: 8E	3B77D8			Proje	ect:			
Sample Date:	: 08 Ap	r-19 07:00	Ma	terial: W	WTF Effluen	t		Sour	rce: Lo	well RWWU	(MA010063	3)
Receipt Date:	: 08 Ap	r-19 15:35	CA	S (PC):				Stati	on:			
Sample Age:	29h		Cli	ent: Ne	ew England T	esting Labs						
Data Transfor	rm		Alt Hyp					NOEL	LOEL	TOEL	TU	PMSD
Untransformed	d		C > T					100	>100	n/a	1	16.09%
Steel Many-O	ne Ran	ık Sum Te	st									
Control	vs	Conc-%		Test Sta			P-Type	P-Value		n(α:5%)		
Dilution Water	•	6,25		95.5	75		Asymp	0.5455	_	nificant Effec		
		12.5		128	75		Asymp	0.9989	-	nificant Effec		
		25		106.5	75		Asymp	0.8650	-	nificant Effec		
		50		97	75		Asymp	0.5980	-	nificant Effec		
		100		81.5	75	2 18	Asymp	0.1312	Non-Sig	nificant Effec	t	
Test Acceptal	bility C	riteria	TAC	_imits								
Attribute		Test Stat	Lower	Upper	Overlap	Decision						
Control Resp	;	36.9	15	>>	Yes	Passes C	riteria					
ANOVA Table)											
Source	:	Sum Squa	res	Mean Sq	uare	DF	F Stat	P-Value	Decisio	n(a:5%)		
		<u>-</u>						7 74140				
Between		336		67.2		5	1.998	0.0937		nificant Effec	t	
		1816.4				5 54				nificant Effec	t	
Error				67.2		5				nificant Effec	t	
Error Total		1816.4		67.2		5 54				nificant Effec	t	
Error Total Distributional	l Tests	1816.4		67.2		5 54	1.998		Non-Sig	nificant Effec en(α:1%)	t	
Error Total Distributional Attribute	I Tests	1816.4 2152.4 Test		67.2		5 54 59	1.998	0.0937	Non-Sig		t	
Error Total Distributional Attribute Variances	l Tests	1816.4 2152.4 Test	uality of Va	67.2 33.637 ariance Tesi		5 54 59 Test Stat	1.998	0.0937 P-Value	Non-Sig Decisio Unequa	·n(α:1%)		
Error Total Distributional Attribute Variances Distribution	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Va	67.2 33.637 ariance Tesi		5 54 59 Test Stat 34.94	1.998 — Critical 15.09	0.0937 P-Value 1.6E-06	Non-Sig Decisio Unequa	on(α:1%) I Variances		
Error Total Distributional Attribute Variances Distribution Reproduction	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Va	67.2 33.637 ariance Tesi		5 54 59 Test Stat 34.94 0.842	1.998	0.0937 P-Value 1.6E-06	Non-Sig Decisio Unequa	on(α:1%) I Variances		%Effect
Error Total Distributional Attribute Variances Distribution Reproduction Conc-%	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Va ilk W Norn	67.2 33.637 ariance Test	1	5 54 59 Test Stat 34.94 0.842	1.998	P-Value 1.6E-06 1.8E-06	Decisio Unequa Non-No	on(α:1%) I Variances rmal Distribut	ion	%Effect 0.00%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Vailk W Norn Count 10 10	67.2 33.637 ariance Test nality Test	95% LCL	5 54 59 Test Stat 34.94 0.842 95% UCL	1.998 — Critical 15.09 0.9459 Median	P-Value 1.6E-06 1.8E-06 Min 22 33	Decisio Unequa Non-No	on(α:1%) I Variances rmal Distribut Std Err 1.991 0.636	ion	
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Vailk W Norm Count 10 10 10	67.2 33.637 ariance Test nality Test Mean 36.9	95% LCL 32.4	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4	1.998 Critical 15.09 0.9459 Median 37.5	P-Value 1.6E-06 1.8E-06	Decisio Unequa Non-No Max	on(α:1%) I Variances rmal Distribut Std Err 1.991	ion CV% 17.07%	0.00% 1.36%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Vailk W Norm Count 10 10 10 10	67.2 33.637 ariance Test nality Test Mean 36.9 36.4 40.9 37.5	95% LCL 32.4 34.96 38.86 34.82	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30	Decisio Unequa Non-No Max 43 39 45 43	Std Err 1.991 0.636 0.9 1.186	CV% 17.07% 5.52% 6.96% 10.00%	0.00% 1.36% -10.84% -1.63%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Vailk W Norm Count 10 10 10 10 10	67.2 33.637 ariance Test mality Test Mean 36.9 36.4 40.9 37.5 33.7	95% LCL 32.4 34.96 38.86 34.82 25.71	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12	Decisio Unequa Non-No Max 43 39 45 43 43	Std Err 1.991 0.636 0.9 1.186 3.534	CV% 17.07% 5.52% 6.96% 10.00% 33.16%	0.00% 1.36% -10.84% -1.63% 8.67%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25	l Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W	uality of Vailk W Norm Count 10 10 10 10	67.2 33.637 ariance Test nality Test Mean 36.9 36.4 40.9 37.5	95% LCL 32.4 34.96 38.86 34.82	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30	Decisio Unequa Non-No Max 43 39 45 43	Std Err 1.991 0.636 0.9 1.186	CV% 17.07% 5.52% 6.96% 10.00%	0.00% 1.36% -10.84% -1.63%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100	I Tests	Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10	67.2 33.637 ariance Test mality Test Mean 36.9 36.4 40.9 37.5 33.7	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12	Decisio Unequa Non-No Max 43 39 45 43 43	Std Err 1.991 0.636 0.9 1.186 3.534	CV% 17.07% 5.52% 6.96% 10.00% 33.16%	0.00% 1.36% -10.84% -1.63% 8.67%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100 Reproduction	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 10	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29	Decisio Unequa Non-No Max 43 39 45 43 41	Std Err 1.991 0.636 0.9 1.186 3.534 1.052	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9	0.00% 1.36% -10.84% -1.63% 8.67% 7.32%
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 1100 Reproduction Conc-% 0 Conc-% 0 Conc-%	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 10 37	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82 Rep 3	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29 Rep 6	Decisio Unequa Non-No Max 43 39 45 43 41 Rep 7	Std Err 1.991 0.636 0.9 1.186 3.534 1.052 Rep 8	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9	0.00% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 10
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100 Reproduction Conc-% 0 6.25	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 37 33	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2 Rep 2	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82 Rep 3 43	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58 Rep 4	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5 Rep 5 43 39	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29 Rep 6 34 36	Decisio Unequa Non-No Max 43 39 45 43 41 Rep 7	Std Err 1.991 0.636 0.9 1.186 3.534 1.052 Rep 8 36 36	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9 43 38	0.00% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 10 39 35
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100 Reproduction Conc-% 0 6.25 12.5 25 100	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 37 33 38	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82 Rep 3	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58 Rep 4	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29 Rep 6	Decisio Unequa Non-No Max 43 39 45 43 41 Rep 7	Std Err 1.991 0.636 0.9 1.186 3.534 1.052 Rep 8	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9 43 38 44	0.00% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 10
Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100 Reproduction Conc-% 0 6.25 12.5 25 100	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 37 33	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2 Rep 2	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82 Rep 3 43	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58 Rep 4	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5 Rep 5 43 39	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29 Rep 6 34 36	Decisio Unequa Non-No Max 43 39 45 43 41 Rep 7	Std Err 1.991 0.636 0.9 1.186 3.534 1.052 Rep 8 36 36	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9 43 38	0.00% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 10 39 35
Between Error Total Distributional Attribute Variances Distribution Reproduction Conc-% 0 6.25 12.5 25 50 100 Reproduction Conc-% 0 6.25 12.5 25 50 100	I Tests	1816.4 2152.4 Test Bartlett Eq Shapiro-W nary Code	uality of Vailk W Norm Count 10 10 10 10 10 37 33 38	67.2 33.637 ariance Test Mean 36.9 36.4 40.9 37.5 33.7 34.2 Rep 2 22 39 37	95% LCL 32.4 34.96 38.86 34.82 25.71 31.82 Rep 3 43 34	5 54 59 Test Stat 34.94 0.842 95% UCL 41.4 37.84 42.94 40.18 41.69 36.58 Rep 4	1.998 Critical 15.09 0.9459 Median 37.5 36.5 41 39 35.5 34.5 Rep 5 43 39 42	P-Value 1.6E-06 1.8E-06 Min 22 33 37 30 12 29 Rep 6 34 36 38	Decisio Unequa Non-No Max 43 39 45 43 41 Rep 7 38 37 41	Std Err 1.991 0.636 0.9 1.186 3.534 1.052 Rep 8 36 36 41	CV% 17.07% 5.52% 6.96% 10.00% 33.16% 9.73% Rep 9 43 38 44	0.00% 1.36% -10.84% -1.63% 8.67% 7.32% Rep 10 39 35 39

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CETIS™ v1.9.4.1

Analyst:_____ QA:____

Report Date:

16 Apr-19 10:13 (p 2 of 2) 19-449 / 10-5501-1956

Test Code/ID:

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: Analyzed:

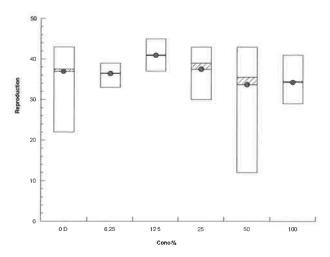
06-1825-2143 16 Apr-19 10:13 Endpoint: Reproduction

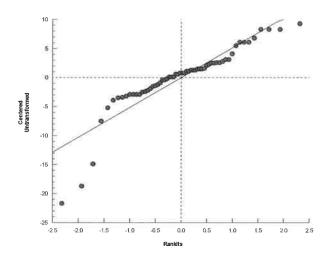
Analysis: Nonparametric-Control vs Treatments

CETIS Version: Status Level:

CETISv1.9.4 1

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NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDE	RESS:				reet Bouleva			
NEB PROJECT NUMBER		-	5.0044476.0		TEST ORGA			odaphnia dubia
DILUTION WATER SOUP			ratory Soft	r –	START DAT		4/9/19	TIME: 1141
ANALYST	CH	MM	MM	PD	PD	CW		
NEB Lab Diluent	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	25.2	25.2	25.1	25.5	25.6		
D.O. mg/L Initial	8.1	8.2	8.2	8.3	8.2	8.3		
ρΗ s.u. Initial	7.4	7.7	7.6	7.5	7.9	8.1		
Conductivity µS Initial	185	187	185	186	190	196		
Temp °C Final	24.1	25.0	25.2	24.7	24.6	25.0		
D.O. mg/L Final	8.4	8.3	8.3	8.2	8.3	7.8		
pH s.u. Final	7.9	8.0	8.0	7.9	8.1	7.2		
Conductivity µS Final	194	198	197	194	193	198		
Merrimack River Control	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	24.6	25.6	24.6	25.4	25.6		
D.O. mg/L Initial	9.1	9.2	10.3	8.7	9.6	8.8		
pH s.u. Initial	7.5	7.6	7.5	7.5	7.4	7.7		
Conductivity µS Initial	124	125	117	116	120	119		
Temp °C Final	24.2	25.0	25.2	24.8	24.6	25.0		
D.O. mg/L Final	8.2	8.3	8.2	8.2	8.1	7.8		
pH s.u. Final	7.7	7.8	7.8	7.7	8.1	6.9		
Conductivity µS Final	133	134	124	125	124	126		
6.25%	1 .	2	3	4	5	6	7	Remarks
	25.2	24.7	25.4	25.0	25.5	25.7		Hemans
Temp °C Initial	8.4	8.4	8.4	9.1	8.4	8.6		
D.O. mg/L Initial	7.4	7.5	7.4	7.4	7.8	7.7		
pH s.u. Initial	248	255	247	241	248	256		
Conductivity µS Initial	24.2			24.9				4
Temp °C Final	 	25.0	25.3		24.5	25.0		
D.O. mg/L Final	8.2	8.3	8.2	8.2	8.0	7.8		
pH s.u. Final	7.7	7.7	7.8	7.9	7.9	7.3		3
Conductivity µS Final	258	262	253	250	258	266		
12.5%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.2	25.2	25.8	25.3	25.6	25.8		
D.O. mg/L Initial	8.2	8.2	8.3	8.3	8.3	8.3		<u></u>
pH s.u. Initial	7.5	7.6	7.6	7.6	7.8	7.7		
Conductivity µS Initial	311	314	321	313	323	332		
Temp °C Final	24.2	25.0	25.3	24.9	24.5	25.1		
D.O. mg/L Final	8.2	8.2	8.3	8.2	8.1	7.9		
pH s.u. Final	7.8	7.8	7.8	7.9	7.9	7.5		
Conductivity µS Final	322	331	326	321	332	341		

NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDR					reet Bouleva		1A 01850	
NEB PROJECT NUMBER:			5.0044476.0		TEST ORGA			daphnia dubia
DILUTION WATER SOUR	CE:	Labo	ratory Soft	Water	START DAT	E:	4/9/19	TIME: 1141
25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.1	25.3	25.8	25.3	25.6	25.8		
D.O. mg/L Initial	8.3	8.1	8.3	8.3	8.4	8.2		
pH s.u. Initial	7.5	7.6	7.6	7.6	7.7	7.7		
Conductivity µS Initial	440	450	453	460	471	478		
Temp °C Final	24.3	24.9	25.2	24.8	24.6	25.1		
D.O. mg/L Final	8.2	8.2	8.3	8.2	8.0	7.9		
pH s.u. Final	7.9	7.9	7.9	8.0	7.9	7.7		
Conductivity µS Final	450	470	456	468	478	489		
50%	1	2	3	4	5	6	7	Remarks
Гетр °С Initial	25.1	25.1	25.8	25.3	25.5	25.9		
D.O. mg/L Initial	8.4	8.2	8.7	8.3	8.8	8.4		
pH s.u. Initial	7.5	7.5	7.5	7.5	7.6	7.6		
Conductivity µS Initial	681	688	727	729	765	759		
Гетр °С Final	24.3	24.9	25.3	24.8	24.4	25.1		
D.O. mg/L Final	8.2	8.2	8.3	8.2	8.0	7.8		
pH s.u. Final	8.1	7.9	8.1	8.1	8.0	7.8		
Conductivity µS Final	687	718	728	738	769	770		
100%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	24.6	25.7	25.2	25.1	25.9		
D.O. mg/L Initial	9.0	8.5	9.4	8.3	9.5	8.6		
oH s.u. Initial	7.4	7.4	7.4	7.5	7.5	7.5		
Conductivity µS Initial	1,204	1,210	1,277	1,273	1,331	1,329		
Temp °C Final	24.2	24.7	25.4	24.8	24.6	25.0		
D.O. mg/L Final	8.2	8.2	8.1	8.1	8.0	7.7		
oH s.u. Final	8.2	8.1	8.2	8.2	8.2	8.0		
Conductivity µS Final	1,207	1,227	1,268	1,274	1,327	1,324		

Tak	ole o	f Ra	ndo	m P	ermuta	tion	s of	16					C.d	ubia	Test	ID#		19-	449	
7	12	15	15	1	2	7	16	10	2	14	1	5	7	13	13	10	6	1	8	10
13	3	8	16	7	10	11	10	13	5	11	. 7	7	13	16	7	7	5	13	2	14
3	1	4	5	14	13	3	14	9	13	13	2	2	9	15	6	2	8	4	5	8
11	8	16	14	15	6	2	6	2	16	8	5	5	12	3	9	13	4	3	10	4
14	9	1	6	3	9	14	13	8	6	5	8	3	14	7	3	15	13	11	4	7
2	16	10	13	5	5	13	2	11	7	3	1	2	5	14	12	16		2	9	15
4	6	13	7	2	15	1	9	1	4	7	1		6	9	11	9	7	6	16	11
6	14	6	10	4	14	4	15	3	3	4	1	6	2	6	5	1	12	10	6	9
10	15	2	1	13	12	16	3	4	8	10			15	5	14	12	14	12	3	2
12	10	7	12	9	11	9	8	12	14	15		•	11	8	16	8	9	14	14	1
15	7	5	2	10	7	8	12	6	15	6	1		16	12	15	4	11	8	12	6
16	2	11	8	8	8	15	5	16	1	1	ç		8	1	8	14	_	5	13	5
9	13	14	3	6	4	10	11	5	12	9	3		10	4	4	3	10	9	1	3
8	11	9	4	11	3	12	7	7	10	12			3	10	1	6	15	16	15	12
1	5	12	11	16	16	5	4	14	9	16			1	2	10	5	1	15	7	13
5	4	3	9	12	1	6	1	15	11	2	E)	4	11	2	11	3	7	11	16
4.4		10	-	_	42		12	2	4.0	4.4		_			-	-	4.2	_	42	2
11	8	16	5	5	13	1	13	2	16	14			9	8	7	5	13	3	13	3
2	2	8	8	14	16	4	3	8	11	10			15	1	2	11		5	15	9
6	13	2	13	6	-5	9	15	11	10	12			16	15	16	9	10	12	16	15
14	12	4	16	16	11	14	10	5	12	3	3		12	14	15	13		4	1	16
8	6	3	9	4	10	6	4	16	2	2	1		8	16	4	6	5	15	7	8
9	15	12	10 12	3 13	2 12	12 5	6 11	1 7	15	4	1		7	7	9	12	14	8	8	11 5
3 16	10 1	11 13	14	8	14	5 15	5	3	8 7	9 11			14 6	11 12	10 5	1 7	3 11	13 1	5 14	4
10	14	14	2	9	15	16	14	6	14	7	. 1		3	13	11	8	7	7	12	7
4	4	6	4	12	3	11	8	15	9	8	1		13	6	3	3	15	9	9	12
15	5	1	11	10	6	3	7	10	5	5	1		10	10	12	15	16	14	5	2
5	3	5	6	7	7	13	2	14	3	16			5	5	13	4	9	16	2	6
12	7	15	15	15	9	8	12	12	13	15			1	4	6	16		6	11	1
10	11	10	3	2	4	2	1	4	6	6	7		11	9	14	10	8	11	4	13
7	9	7	7	11	1	7	16	13	1	13			4	2	1	2	12	2	10	14
13	16	9	1	1	8	10	9	9	4	1	1		2	3	8	14	1	10	6	10
1	6	7	4	8	6	5	2	8	15	4	6		6	1	4	5	7	13	2	10
9	15	11	3	11	15	9	10	1	3	8	2	-	15	7	9	8	16	1	14	3
10	16	4	5	12	9	16	11	7	1	7	1	6	11	8	3	3	12	2	3	4
4	14	1	9	5	5	4	13	6	8	15			12	5	7	16	5	11	8	1
7	3	13	14	15	2	1	14	16	5	14)	2	16	1	12		14	4	13
16	11	2	1	14	16	6	9	3	4	16			3	15	11	11	3	9	12	5
3	10	16	16	13	7	13	1	11	14	9	10		16	2	10	2	10	7	10	16
11	13	9	13	4	13	8	3	5	13	10			5	12	5	14	13	16	5	6
15	2	3	12	9	12	2	4	13	10	3	1		14	4	2	1	14	8	6	12
14	1	14	6	10	1	3	12	4	2	2	4		13	3	16	9	9	3	7	14
13	12	5	11	3	11	15	8	2	7	11			8	14	6	4	4	4	15	11
12	5	10	7	2	14	7	15	14	16	13			9	10	12	10		10	9	8
8	9	8	10	6	4	11	7	10	11	6	8		4	9	8	15		6	11	9
2	7	6 15	2	1	8	10	6	15	12	1	1:		7	11	13	6	1	15	13	15 7
6	4	15	8 1 E	16	10	14	16	9	6	12			10	6	14	7	2	12	16	7
5	8	12	15	7	3	12	5	12	9	5		2	1	13	15	13	15	5	1	2
12	Л	10	1	16	13	16	12	_	2	CO	ו 14	1	1	10	0	7	2	rep	2	17
13	4	10	4	16	13	16	13	5	3	6			1	16	8	7	2	3	3	12 7
5 2	14 2	4 2	6 15	8 14	2 16	15 9	1 12	13 16	14 6	16 10			15 14	4 9	3 10	12 1	12 14	1 8	4 8	7 16
7	12	2 15	8	12	3	5	14	7	12	5	1:			1	10 7	5	14		8 9	16 3
6	9	15 7	8 14	9	3 14	5 10		/ 15	11	12			16 12	1 12		16		2 11		8
6 14		16			8	10	11								14				11	
14 15	5 11	8	7 9	10 7	8 12	8	8 7	14 1	13 15	7 9	1:		6 3	3 7	11 13	4	4 10	6 4	6 5	9 1
11	6	6	9	4	12	3	16	12	5	4	9		3 13	13	6	11 8	15	9	5 1	1 14
4	10	3	16		11	3 7	9	6	9	1	8		4							
1	8 10	1	13	2 1	15	4	4	11		2	10		4 5	11 8	5 1	2 9	16 5	10 12	12 16	4
9	8 7	1 14	13 2			4 14	4 10	9	4	2 15										6
9 12	1	9	10	6 15	4 5	2	15	10	8 2	14			7 8	10 2	9 4	10 13	6 8	14 5	10 15	11 5
3	3	12	11	5	9	6	6	3	10	13			9	6	2	15		5 15	7	13
3 10	3 15	11	5	5 13	9 7	12	5	2	7	11			10	15	12	3	1	13	13	10
8	13	13	3	3	10	13	2	4	1	8	6		11	14	15	6	9	16	2	2
16	16	5	12	11	6	1	3	8	16	3	7		2	5	16	14		7	14	15
10	10	,			U	-	5	J	10	3	,		_	,	10	14	13	,	1-7	1.5

Project #	Symbols (✓ / P)	(Y/N)	Time period, neonates released	Collection date / time
0044476	D	Y	4-8-19/1600 -> 4-8-19/1900	4.9.19/1040
	T			
	T			
	T.			
	Т	1, E17		
	Т			

Lowell 49-19 Brood mother source: RmH Oleo Source's brood size: (Qty.) 34 me Tech KF KF AH ALL AH 4-8 4. 4-4 4.2 Date 9 10 11 12 13 14 Day acc. Cup# 1200. TI N N 1 N N 1 Ν 4200 2 N N 2 Ν 2 Ν 420 TZ 6 10 N Y 20 N N 3 3 Ν Ν 420 T3 5 N 1/23 4 Ν N 42B TY Y24 N N 5 Ν Ν 75 5 N 721 6 6 Ν Ν +216 16 N Y 20 N N 7 1213 TT 10 5 N Y 23 8 Ν Ν 26 78 N 419 9 Ν 120 79 10 5 Y 21 10 120 TIC N 11 Ν 1710 \mathcal{N} 12 Ν 12 N 13 Y = neonates present, and criterion has been met: ≥ 20 neonates produced in total by 3rd brood.

N = no neonates

2B = two broods present. **2Y** = two broods and criterion met: ≥ 20 neos. by 3rd brood.

X = brood mother dead **ae** = aborted eggs

✓ or **P** = neonates present after renewal on previous day (see time in log).

A→ = acceptable for acute testing only

T# = neonates used in test, replicate number of test noted (and brood counted).

acc. = if acclimated, H₂O type used w/ renewal this day.

Test organism collection:

Tray diagram

used? Symbols (✓ / P)

Project #	Symbols (7 / P)	(Y/N)	Time period, neonates released	Collection date / time
0044087	Т	4	4-8-19/1440 -> 4-8-19/1900	4-9-19/1015
0044476	J	Y	4-8-19/1600 -> 4-8-19/1900	4-9-19/1040
	Т		7	/
	Т			
	Т			
	Т			

SAMPLE RECEIPT CHEMISTRY & CHAIN OF CUSTODY DOCUMENTS

NEW ENGLAND BIOASSAY - INITIAL CHEMISTRY DATA

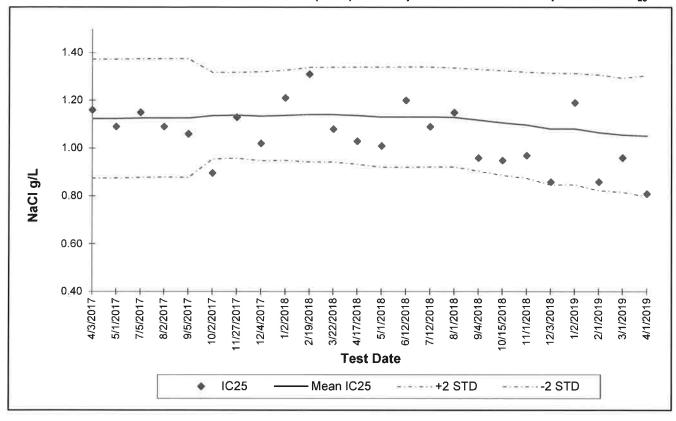
PERMITTEE: _	Lowell RWWU
NEB JOB #	05.0044476.00

DATE RECEIVED	4/8	/19	4/1:	1/19	4/1:	2/19
SAMPLE TYPE:	EFF#1	RIVER #1	EFF #2	RIVER #2	EFF #3	RIVER #3
COC#	C39-1787	C39-1788	C39-1835	C39-1836	C39-1875	C39-1876
pH (SU)	7.1	6.9	7.2	7.4	7.1	7.1
Temperature (°C)	7.7	8.6	8.2	6.1	4.5	4.6
Dissolved Oxygen (mg/L)	8.5	9.2	10.5	11.0	11.5	12.5
Conductivity (µmhos)	1,232	125	1,297	116	1,365	119
Salinity (ppt)	< 1	< 1	<1	<1	<1	<1
TRC - DPD (mg/L)	0.013	0.004	0.011	0.005	0.027	0.009
TRC - Amperometric (mg/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L as CaCO ₃)	90	14	110	14	104	14
Alkalinity (mg/l as CaCO ₃)	100	10	110	10	120	10
Tech Initials	CW	CW	PD	PD	КО	КО

NOTE: NA = NOT API	LICABLE		
			1 [
Data Reviewed By:	// Wills	Date Reviewed:	5/6/19
U			

REFERENCE TOXICANT CHARTS

New England Bioassay
Reference Toxicant Data: Sodium chloride (NaCl) Ceriodaphia dubia Chronic Reproduction IC₂₅



								Repro PMSD	Avg. PMSD
Test ID	Date	IC ₂₅	Mean IC ₂₅	STD	-2STD	+2STD	Avg. CV	(%)	(%)
17-480	4/3/2017	1.16	1.12	0.12	0.87	1.37	0.11	13.66	15.27
17-616	5/1/2017	1.09	1.12	0.12	0.88	1.37	0.11	8.00	14.84
17-972	7/5/2017	1:15	1.13	0.12	0.88	1.37	0.11	12.67	14.72
17-1146	8/2/2017	1.09	1,13	0.12	0.88	1.38	0.11	23.94	15.20
17-1317	9/5/2017	1.06	1.13	0.12	0.88	1.38	0.11	33.78	16.13
17-1516	10/2/2017	0.90	1,:14	0.09	0.95	1.32	0.08	24.47	16.53
17-1787	11/27/2017	1.13	1,14	0.09	0.96	1.32	0.08	19.97	16.69
17-1846	12/4/2017	1.02	1.13	0.09	0,95	1.32	0.08	14.69	16.60
18-10	1/2/2018	1.21	1.14	0.09	0.95	1,33	0.08	10.81	16.36
18-271	2/19/2018	1.31	1,14	0.10	0.94	1.34	0.09	22.90	16.56
18-416	3/22/2018	1.08	1.14	0.10	0.94	1.34	0.09	17.59	16.88
18-553	4/17/2018	1.03	1.14	0.10	0.93	1.34	0.09	38.54	17.77
18-607	5/1/2018	1.01	1.13	0.10	0.92	1.34	0.09	24.65	18.25
18-816	6/12/2018	1,20	1,13	0.11	0.92	1.34	0.09	46.97	19.59
18-996	7/12/2018	1.09	1.13	0.10	0.92	1.34	0.09	11.41	19.70
18-1103	8/1/2018	1.15	1.13	0.10	0.92	1.34	0.09	17.23	19.67
18-1315	9/4/2018	0.96	1.12	0.11	0.91	1.33	0.10	22.12	20.09
18-1577	10/15/2018	0.95	1.11	0.11	0.89	1.33	0.10	24.32	20.64
18-1625	11/1/2018	0.97	1.10	0.11	0.88	1.32	0.10	31.57	21.34
18-1756	12/3/2018	0.86	1.08	0.12	0.85	1.32	0.11	15.77	21.00
19-8	1/2/2019	1,19	1,08	0,12	0.85	1.31	0.11	40.72	21.30
19-177	2/1/2019	0.86	1.07	0.12	0.82	1.31	0.11	18.71	21.63
19-265	3/1/2019	0.96	1.06	0.12	0.82	1.29	0.11	19.84	22.13
19-403	4/1/2019	0.81	1.05	0.13	0.80	1,30	0.12	10.09	21.85

National 75th Percentile and 90th Percentile CV Averages for Ceriodaphnia Reproduction IC25 (EPA 833-R-00-003): 0.45 - 0.62 PMSD Upper and Lower Bounds for Ceriodaphnia Reproduction (EPA-821-R-02-013): 13% - 47%

Work Order: 9D08025 Date: 5/7/2019 11:30:20AM

Results:

Sample: Effluent

9D08025-01 (Water)

General Chemistry

	Result	Reporting Limit	Units	Date Analyzed
Alkalinity as CaCO3	110	4	mg/L	04/10/19
Ammonia	16.3	0.5	mg/L	04/11/19
рН	7.3	0.1	SU	04/08/19 16:40
Specific Conductance	1160	2	uS/cm	04/09/19
Total Dissolved Solids	508	10	mg/L	04/09/19
Total Organic Carbon	7.8	1.0	mg/L	04/09/19
Total solids (TS)	580	10	mg/L	04/09/19
Total Suspended Solids	6	2	mg/L	04/09/19

Total Metals

	Result	Reporting	Units	Date
		Limit		Analyzed
Calcium	28.9	0.01	mg/L	04/10/19
Magnesium	5.10	0.01	mg/L	04/10/19
Cadmium	ND	0.0001	mg/L	04/11/19
Lead	0.0007	0.0002	mg/L	04/15/19
Aluminum	0.031	0.012	mg/L	04/10/19
Copper	0.008	0.005	mg/L	04/10/19
Nickel	0.005	0.001	mg/L	04/10/19
Zinc	0.073	0.005	mg/L	04/10/19
Total Hardness	93.2	0.0312	mg/L	04/10/19

Sample: Merrimack River

9D08025-02 (Water)

General Chemistry

	Result	Reporting Limit	Units	Date Analyzed
Alkalinity as CaCO3	7	2	mg/L	04/10/19
Ammonia	0.1	0.1	mg/L	04/11/19
pH	7.0	0.1	SU	04/08/19 16:40
Specific Conductance	115	2	uS/cm	04/09/19
Total Dissolved Solids	16	10	mg/L	04/24/19
Total Organic Carbon	2.4	1.0	mg/L	04/09/19
Total solids (TS)	72	10	mg/L	04/09/19
Total Suspended Solids	ND	2	mg/L	04/09/19

Work Order: 9D08025 Date: 5/7/2019 11:30:20AM

Sample: Merrimack River (Continued)

9D08025-02 (Water)

Total Metals

	Result	Reporting Limit	Units	Date Analyzed
Calcium	4.33	0.01	mg/L	04/10/19
Magnesium	0.88	0.01	mg/L	04/10/19
Cadmium	ND	0.0001	mg/L	04/11/19
Lead	0.0008	0.0002	mg/L	04/15/19
Aluminum	0.141	0.012	mg/L	04/10/19
Copper	ND	0.005	mg/L	04/10/19
Nickel	ND	0.001	mg/L	04/10/19
Zinc	0.011	0.005	mg/L	04/10/19
Total Hardness	14.4	0.0312	mg/L	04/10/19

Sample Sel 71

NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY

<u>EFFLUENT</u>	RECEIVING WATER
Sampler: JIN BOK MEGOSAN	Sampler: Auron Fox
Sampler: JIN BOK MCGOSAN Title: (Hemist	Title: Ops superinter
Facility: Lowell Regional Wastewater Utilities	Facility: Lowell Regional Wastewater Utilities
Sampling Method: X Composite	Sampling Method: X Grab
Sample ID:	Sample ID: Merrimack River
Start Date: 4-7-19 Time: 73-0	Date Collected: 4- 4- 19
Start Date: $4-7-19$ Time: $73-0$ End Date: $4-8-19$ Time: $7=-0$	Date Collected: $4-9-19$ Time Collected: $9-30Ay$
Sampling Method: Grab (for pH and TRC only)	
Date Collected:	
Time Collected:	
Sample Type: Prechlorinated	
X Dechlorinated Unchlorinated	* *
Chlorinated	Received
	ON IGE
Receiving Water Sampling Location and Procedures: Merrimack (Rt.38)	River upstream of the plant discharge at the Hunts Fall Bridge,
Requested Analysis: X Chronic and modified acute	
Sample S	hipment
Method of Shipment: New England Testing Labs	
Relinquished By: Date: Date:	4-8-19 Time: 10=30
Received By: Blacker Date:_	4-8-19 Time: 10:35
Relinquished By: B Payers Date:	4-8-19 Time: 1445
Received By: Date:	4-8-19 Time: 1445
Relinquished By: Oh Date:	4-18-19 Time: 1535
Received By: Date:_	4/8/19 Time: 1535
FOR NEB U	
* Please return all ice packs NEB has provided to insure ac	curate temperature upon receipt to the NEB laboratory *
Temperature of Effluent Upon Receipt at Lab: 17 °C Te	emperature of Receiving Water Upon Receipt at Lab: 8 6 °C

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

Receiving Water COC# ___

(39-1787

Effluent COC# ___

NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY

EFFLUENT	RECEIVING WATER			
Sampler: TN-BOK M CODNAN	Sampler: Aasom Fox			
Title: 64=7157	Title: Ops Suppointenan			
Facility: Lowell Regional Wastewater Utilities	Facility: Lowell Regional Wastewater Utilities			
Sampling Method: X Composite	Sampling Method: X Grab			
Sample ID: PLT EFE	Sample ID: Merrimack River			
Start Date: 4-9-2014 Time: 72-0	Date Collected: $8 = 30 \text{ Arg}$			
End Date: 4-12-2019 Time: 7-20	Time Collected: S=> 2 Ary			
Sampling Method: Grab (for pH and TRC only Date Collected: Time Collected:				
Sample Type: X Dechlorinated Unchlorinated Chlorinated				
Effluent Sampling Location and Procedures: Plant outfall after	dechlorination. 24 hr. composite.			
Receiving Water Sampling Location and Procedures: Merrimack (Rt.38)	River upstream of the plant discharge at the Hunts Fall Bridge,			
Requested Analysis: X Chronic and modified acute	Received			
	ON ICE			
Sample S	hipment			
Method of Shipment: New England Testing Labs				
Relinquished By: Date:_	4-10-19 Time: 115101			
2011	4/10/19 Time: 11:10 ~			
Relinquished By: Date:_	4/10/19 Time: 1500			
Received By: Date:	4-10 19 Time: 1500			
Relinquished By: Date:	4-10-19 Time: 1545			
Received By: Date:_	4/10/19 Time: 1545			
FOR NEB USE ONLY				
* Please return all ice nacks NFR has provided to insure a				
T lease return an ree packs NED has provided to insure at	USE ONLY curate temperature upon receipt to the NEB laboratory *			
♥ つ				

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042 Sample Set #3

NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY

EFFLUENT	RECEIVING WATER
Sampler: JIN BOK MCGOW-	Sampler: Adron Fox
Title: 6 47 57	Title: SPS super in-
Facility: Lowell Regional Wastewater Utilities	Title:
Sampling Method: X Composite	Sampling Method: X Grab
Sample ID:	Sample ID: Merrimack River
Start Date: 4-11-2019 Time: 7=00	Date Collected: 4-1>-19
Start Date: 4-11-2019 Time: 7=05 End Date: 4-12-2019 Time: 7=05	Time Collected: $P = S$
Sampling Method: Grab (for pH and TRC only)	
Date Collected:	
Time Collected:	
Sample Type: X Dechlorinated Unchlorinated Chlorinated	
Effluent Sampling Location and Procedures: Plant outfall after de	chlorination. 24 hr. composite.
Receiving Water Sampling Location and Procedures: Merrimack I (Rt.38)	River upstream of the plant discharge at the Hunts Fall Bridge,
	Described
Requested Analysis: X Chronic and modified acute	Received ON ICE
Sample Sh	
Method of Shipment: New England Testing Labs	
Relinquished By: Relinquished By: Date:	4-12-19 Time: 12=30
Received By: Braulius Date:	A-12-19 Time: 12-67)
Relinquished By: Date:	4/12/15' Time: 1420
Received By: Date:	4/12/16 Time: /420
Relinquished By: Date:	1/12/16 Time: 1575
Received By: Date:	4/12/19 Time: 1520
FOR NEB US	SE ONLY
* Please return all ice packs NEB has provided to insure acc	urate temperature upon receipt to the NEB laboratory *
Temperature of Effluent Upon Receipt at Lab: 4-5 °C Temperature	mperature of Receiving Water Upon Receipt at Lab: 49 °C

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

Effluent COC#

Receiving Water COC#